This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (original) A data storage unit, comprising:

a data storage layer having a plurality of data storage areas for storing and reading data thereon during read and write phases, respectively;

an array of directed light beam emitters in close proximity to the data storage layer for selectively directing a first light beam to the data storage layer to write data in certain data storage areas during the write phase and for selectively directing a second light beam to the data storage layer to read data in certain data storage areas during a read phase;

a medium disposed on the data storage areas that changes between a plurality of states in response to the first directed light beam during the write phase, and that generates electron-hole pairs in response to the second directed light beam during the read phase, the plurality of states exhibiting substantial differences in the activity of electron-hole carrier pairs generated in response to the second directed light beam;

a detection region in communication with the data storage areas for determining the activity of the electron-hole pairs during the read phase, the activity of electron-hole pairs being relative to the state of each storage areas; and

a detector associated with the detection region for measuring the activity of the electron-hole carrier pairs to determine the data stored in the data storage areas.

2. (original) The data storage unit as recited in claim 1, wherein the array of light beam emitters comprises near-field light emitters for selectively directing an evanescent field from the light emitters onto the data storage layer to write data into the data storage areas and to read said data.

3. (original) The data storage unit as recited in claim 1, wherein the detection region is

the junction of a semiconductor diode and the activity of the electron-hole carrier pairs comprises the amount of electron-hole carrier pairs that flow across the junction of a semiconductor diode.

4. (original) The data storage unit as recited in claim 3, wherein the detector for measuring electron-hole carrier pair activity is a voltage detector for measuring the photovoltage developed across the junction.

5. (original) The data storage unit as recited in claim 3, wherein the detector for measuring the amount of electrical carrier flow is a meter for measuring the flow of carriers across the semiconductor diode junction.

6. (original) The data storage unit as recited in claim 1, wherein the region for detecting the electron-hole carrier pair activity comprises a photoconductivity region having a photoconductive material and two spaced apart electrodes with a potential across the two electrodes to direct the carrier flow between the electrodes in the photoconductive material.

7. (original) The data storage unit as recited in claim 6, wherein the detector for measuring the amount of electrical carrier flow is a meter for measuring the flow of carriers between the electrodes in the photoconductive material.

8. (original) The data storage unit as recited in claim 1, wherein the medium is a photo-luminescent material responsive to the second light beam for generating photon emissions in response to the recombination of the electron-hole carrier pairs generated during the read phase.

9. (original) The data storage unit as recited in claim 8, wherein the detector region is a photodiode for generating current in response to the photon emissions.

10. (original) The data storage unit as recited in claim 1, and further comprising a layer superimposed over the storage layer to protect the storage layer.

11. (original) The data storage unit as recited in claim 1, wherein the medium comprises a material susceptible to changing states in response to the first directed light beam.

12. (original) The data storage unit as recited in claim 1, and further comprising a secondary layer adjacent to the storage layer to enhance the thermal properties of the data storage unit.

13. (original) The data storage unit as recited in claim 1, and further comprising a secondary layer adjacent to the storage layer to enhance the optical properties of the data storage unit.

14. (original) The data storage unit as recited in claim 1, and further comprising a secondary energy source for biasing the storage areas to facilitate data storage or reading.

15. (original) A device for reading data stored in a data storage unit, comprising:

a data storage layer having a plurality of data storage areas including a medium disposed thereon susceptible to changing states in response to the application of energy to the medium;

an array of directed light beam emitters in close proximity to the data storage layer for selectively reading the data stored in the data storage areas by directing light beams to excite the medium in the data storage areas and generate electron-hole pairs, the activity of generated electron-pairs being relative to the state of the medium in each data storage area;

a detection region in communication with the data storage areas for detecting the activity of the electron-hole pairs during the read phase, the amount of activity being variable in response to excitation of the data storage areas by the light beam emitters and the state of the data storage

areas; and

a detector for measuring the amount of electron-hole carrier pair activity in the detection region to determine the data stored in the data storage areas.

16. (original) The device for reading data as recited in claim 15, wherein the array of light beam emitters comprises near-field light emitters spaced less than a light wavelength from the data storage layer for selectively directing an evanescent field from the light emitters onto the data storage layer to write data into the data storage areas and to read said data.

17. (original) The device for reading data as recited in claim 15, wherein the region for detection of electron-hole pair activity comprises a semiconductor diode junction having a potential across the junction for directing the carrier flow across the junction and wherein the electron-hole pair activity comprises the amount of electron-hole pairs flowing across the junction.

18. (original) The device for reading data as recited in claim 15, wherein the region for controlling the detection of the electron-hole carrier activity comprises a photoconductivity region having a photoconductive material and two electrodes with a potential across the two electrodes to direct the carrier flow between an emitter electrode and a receptor electrode in the photoconductive material and wherein the electron-hole carrier activity is the amount of electron-hole carriers that reach the receptor electrode.

19. (original) The device for reading data as recited in claim 15, wherein the medium is a photo-luminescent material responsive to the directed light beam for generating photon emissions in response to the recombination of the electron-hole carrier pairs generated during the

read phase.

20. (original) A method for writing and reading data in a data storage unit including a data storage layer having a plurality of data storage areas with a medium disposed thereon that is susceptible to changing states in response to light beam energy for storing and reading data thereon during read and write phases, respectively, comprising:

selectively directing a first light beam to the medium to write data in certain data storage areas during the write phase by changing states of the medium using light beam emitters in close proximity to the data storage layer;

selectively directing a second light beam to the medium on the data storage areas to read data in certain data storage areas during the read phase by generating electron-hole pairs, the activity of the electron-hole pairs being relative to the state of the medium;

determining the activity of the electron-hole pairs during the read phase, the activity being in a detection region in communication with the data storage areas, the activity of electron-hole pairs being dependent on the state of each of the data storage areas; and

measuring the amount of electron-hole carrier pair activity in the detection region to detect the presence of data bits in the storage areas.

21. (original) The method for storing and reading data recited in claim 20 wherein the step of selectively directing first and second light beams comprises:

arranging an array of near-field light emitters spaced less than a light wavelength from the data storage layer;

generating from the near-field light emitters a plurality of evanescent light fields in contact with the data storage layer to write the data on the medium in the data storage areas

during the write phase and to read the data from the data storage areas during the read phase.

22. (original) The method for storing and reading data recited in claim 20 wherein the electron-hole carrier pair activity is generated by carriers generated in the data storage layer in response to light from the light beams.

23. (original) The method of storing and reading data recited in claim 20 wherein the electron-hole carrier pair activity is generated by photons generated in the data storage layer in response to light from the light beams.

24. (original) The method of storing and reading data recited in claim 20 wherein during the read phase, the light beams are directed toward the storage area in a constant flux mode.

25. (original) The method of storing and reading data recited in claim 20 wherein the light beams are directed toward the storage area in a modulated flux mode.